IN THE CLAIMS:

The text of all pending claims is set forth below. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Although no claims are currently amended, the text of the claims are provided for the convenience of the Examiner.

1. (ORIGINAL) A method of automatically controlling an output power of a laser diode, the method comprising:

generating an error voltage between an output voltage of the laser diode sampled during an automatic power control period and a reference voltage; and

performing proportional-integral processing on the error voltage to generate a compensated control voltage and applying the compensated control voltage to the laser diode.

2. (ORIGINAL) The method of claim 1, wherein the output voltage is an effective output voltage within a predetermined range.

3. (ORIGINAL) The method of claim 1, wherein the compensated control voltage applied to the laser diode is an effective control voltage within a predetermined range.

4. (ORIGINAL) A method of automatically controlling an output power of a laser diode, the method comprising:

setting an automatic power control period for the laser diode;

converting an output voltage of the laser diode from an analog form to a digital form;

generating an error voltage between a reference voltage and an effective output voltage extracted from digital output voltages sampled during the automatic power control period;

performing proportional-integral processing on the error voltage to generate a compensated control voltage and generating an effective control voltage using the compensated control voltage; and

converting the effective control voltage from the digital form to the analog form.

5. (ORIGINAL) The method of claim 4, wherein the generation of the error voltage comprises:

sampling the digital output voltage of the laser diode during the automatic power control period;

extracting the sampled digital output voltage that exists within a range between a first maximum and a first minimum as the effective output voltage;

calculating an average effective output voltage; and

generating the error voltage between the average effective output voltage and the reference voltage.

6. (ORIGINAL) The method of claim 5, wherein the performing of the proportional integral processing comprises:

performing the proportional-integral processing on the error voltage to generate the compensated control voltage; and

generating the compensated control voltage that exists within a range between a second maximum and a second minimum as the effective control voltage.

7. (ORIGINAL) A computer readable medium having embodied thereon a computer program for automatically controlling an output power of a laser diode comprising:

generating an error voltage between an output voltage of the laser diode sampled during an automatic power control period and a reference voltage; and

performing proportional-integral processing on the error voltage to generate a compensated control voltage and applying the compensated control voltage to the laser diode.

8. (ORIGINAL) A computer readable medium having embodied thereon a computer program for automatically controlling an output power of a laser diode, comprising:

setting an automatic power control period for the laser diode;

converting an output voltage of the laser diode from an analog form to a digital form;

generating an error voltage between a reference voltage and an effective output voltage extracted from digital output voltages sampled during the automatic power control period;

performing proportional-integral processing on the error voltage to generate a compensated control voltage and generating an effective control voltage using the compensated control voltage; and

converting the effective control voltage from the digital form to the analog form.

9. (ORIGINAL) An apparatus to automatically control an output power of a laser diode, the apparatus comprising:

an error voltage generation unit generating an error voltage between an output voltage of the laser diode sampled during an automatic power control period and a reference voltage; and

a control voltage generation unit performing proportional-integral processing on the error

voltage provided from the error voltage generation unit to generate an effective control voltage.

10. (ORIGINAL) The apparatus of claim 9, wherein the error voltage generation unit comprises:

an analog-to-digital converter converting the output voltage of the laser diode from an analog form to a digital form;

an effective output voltage extractor extracting an effective output voltage from the digital output voltage provided from the analog-to-digital converter; and

a subtractor subtracting the reference voltage from the effective output voltage provided from the effective output voltage extractor to generate the error voltage.

11. (ORIGINAL) The apparatus of claim 10, wherein the effective output voltage extractor comprises:

a sampler sampling the digital output voltage provided from the analog-to-digital converter during the automatic power control period;

a comparator comparing the sampled output voltage with a first maximum and a first minimum, determining whether the sampled output voltage exists within an effective range defined by the first maximum and the first minimum, and extracting the effective output voltage within the effective range;

an accumulator accumulating the effective output voltage extracted by the comparator; and

a divider dividing the accumulated effective output voltage by a number of accumulations to obtain an average effective output voltage.

12. (ORIGINAL) The apparatus of claim 10, wherein the effective output voltage extractor comprises:

a sampler controlling the analog-to-digital converter to perform conversion only during the automatic power control period;

a comparator comparing the output voltage provided from the sampler with a first maximum and a first minimum, determining whether the sampled output voltage exists within an effective range defined by the first maximum and the first minimum, and extracting the effective output voltage within the effective range;

an accumulator accumulating the effective output voltage extracted by the comparator; and

a divider dividing the accumulated effective output voltage by a number of accumulations to obtain an average effective output voltage.

13. (ORIGINAL) The apparatus of claim 11, further comprising;

a multiplier multiplying an output of the divider by a predetermined multiplication constant.

14. (ORIGINAL) The apparatus of claim 12, further comprising:

a multiplier multiplying an output of the divider by a predetermined multiplication constant.

15. (ORIGINAL) The apparatus of claim 11, wherein the control voltage generation unit comprises:

a proportional-integral processor performing proportional-integral processing on the error voltage provided from the error voltage generation unit using a predetermined proportional constant and a predetermined integral constant to generate a compensated control voltage;

an effective control voltage extractor extracting the effective control voltage from the compensated control voltage provided from the proportional-integral processor; and

a digital-to-analog converter converting the effective control voltage provided from the effective control voltage extractor to an analog form and applying the effective control voltage in the analog form to the laser diode.

16. (ORIGINAL) The apparatus of claim 15, wherein the effective control voltage extractor compares the compensated control voltage with a second maximum and a second minimum, to define an effective range to determine whether the compensated control voltage exists within the effective range, and extracts the effective control voltage within the effective range.

17. (ORIGINAL) The apparatus of claim 15, further comprising:

a divider dividing the effective control voltage provided from the effective control voltage extractor by a predetermined division constant.

18. (ORIGINAL) A laser printer controller with a laser diode, comprising:

an engine processor module controlling an entire operation of a printer engine; and

an automatic power control module of the laser diode automatically controlling an output power of the laser diode positioned within a laser scanning unit by sampling an effective output voltage from an output power of the laser diode during a automatic power control period and performing proportional-integral processing on the effective output voltage, wherein the laser

printer controller is structured in a single integrated circuit.

19. (ORIGINAL) The laser printer controller of claim 18, wherein the automatic power control module of the laser diode comprises:

an analog-to-digital converter converting the output voltage of the laser diode from an analog form to a digital form;

an error voltage generation unit generating an error voltage between a reference voltage and the effective output voltage, which is selected from digital output voltages extracted during the automatic power control period;

a control voltage generation unit performing the proportional-integral processing on the effective output voltage to generate a compensated control voltage and generating an effective control voltage using the compensated control voltage; and

a digital-to-analog converter converting the effective control voltage from the digital form to the analog form.

20. (ORIGINAL) A printer controller controlling a laser diode and connected to a printer engine, comprising:

an engine processor module controlling an operation of the printer engine; and

an automatic power control module automatically controlling an output power of the laser diode by generating an error voltage between an output voltage of the laser diode sampled during an automatic power control period and a reference voltage, and performing proportional-integral processing on the error voltage to generate a compensated control voltage and applying the compensated control voltage to the laser diode.

21. (ORIGINAL) The printer controller of claim 20, wherein the automatic power control module comprises:

an error voltage generation unit generating the error voltage between the output voltage of the laser diode, which is extracted for a duration of the automatic power control period, and the reference voltage.

22. (ORIGINAL) The printer controller of claim 21, wherein the error voltage generation unit comprises:

an analog-to-digital converter converting a voltage of the output power of the laser diode to a digital output voltage.

23. (ORIGINAL) The printer controller of claim 22, wherein the error voltage

generation unit further comprises:

a sampler sampling the digital output voltage from the analog-to-digital converter during the automatic power control period;

a first comparator setting a first maximum and a first minimum to define an effective range of the digital output voltage of the laser diode, comparing the first maximum and the first minimum with the sampled digital output voltage received from the sampler, determining whether the sampled digital output voltage exists within the effective range, and outputting an effective output voltage;

an accumulator accumulating the effective output voltage; and

a first divider dividing an accumulated result output from the accumulator by a number of accumulations to calculate an average effective output voltage.

24. (ORIGINAL) The printer controller of claim 23, wherein the error voltage generation unit further comprises:

a multiplier multiplying the average effective output voltage by a predetermined multiplication constant Km to simplify a decimal point calculation in the proportional-integral processing and outputting a multiplied result; and

a subtractor subtracting the reference voltage from the multiplied result to generate an error voltage.

25. (ORIGINAL) The printer controller of claim 23, wherein the sampler sets the automatic power control period and controls the analog-to-digital converter to perform the conversion of the voltage of the output power only during the automatic power control period.

26. (ORIGINAL) The printer controller of claim 23, wherein the sampler sets a number of samplings during the automatic power control period.

27. (ORIGINAL) The printer controller of claim 24, wherein the automatic power control module further comprises a control voltage generation unit comprising:

a proportional section multiplying the error voltage by a proportional constant Kp to generate a proportional term;

an integral section accumulating the error voltage and multiplying the accumulated error voltage by an integral constant Ki to generate an integral term; and

an adder adding the proportional term and the integral term and outputting a result of the addition.

28. (ORIGINAL) The printer controller of claim 27, wherein the control voltage generation unit further comprises:

a second comparator setting a second maximum and a second minimum to define an effective range of a control voltage for the laser diode, comparing the proportional-integral processed error voltage with the second maximum and the second minimum, and determining whether the control voltage exists within the effective range,

a second divider receiving an effective control voltage within the effective range, wherein when the control voltage is beyond the effective range, the control voltage is ignored, and the second comparator waits until another control voltage obtained during a next automatic power control period is received from the proportional-integral processor,

a switch switching the output of the effective control voltage provided from the second divider, and

a digital-to-analog converter converting the effective control voltage provided from the switch to an analog form and applies the converted effective control voltage to the laser diode.

29. (ORIGINAL) The printer controller of claim 28, wherein the second divider divides the effective control voltage received from the second comparator by a division constant Kd and outputs the divided effective control voltage to the switch.

30. (ORIGINAL) The printer controller of claim 29, wherein the division constant Kd is the same as the multiplication constant Km.

31. (ORIGINAL) The printer controller of claim 27, wherein, the error voltage generation unit further comprises a multiplier and the control voltage generation unit further comprises a second divider to simplify a decimal point calculation.

32. (ORIGINAL) The printer controller of claim 28, wherein when the control voltage is beyond the effective range, the control voltage is ignored, and the second comparator waits until another control voltage obtained during a next automatic power control period from the proportional-integral processing.

33. (ORIGINAL) A method of a printer controller controlling a laser diode and connected to a printer engine, the method comprising:

controlling an operation of the printer engine;

automatically controlling an output power of the laser diode by generating an error voltage between an output voltage of the laser diode sampled during an automatic power control

period and a reference voltage; and

performing proportional-integral processing on the error voltage to generate a compensated control voltage and applying the compensated control voltage to the laser diode.

34. (ORIGINAL) A computer readable medium having embodied thereon a computer program for automatically controlling an output power of a laser diode, comprising:

controlling an operation of the printer engine;

automatically controlling an output power of the laser diode by generating an error voltage between an output voltage of the laser diode sampled during an automatic power control period and a reference voltage; and

performing proportional-integral processing on the error voltage to generate a compensated control voltage and applying the compensated control voltage to the laser diode.